

as methyl acrylate, ethyl acrylate and butyl acrylate; alkyl methacrylates such as methyl methacrylate, ethyl methacrylate and butyl methacrylate; polymerizable aromatic unsaturated compounds such as styrene, p-styrenesulfonic acid and indene; olefins such as isobutylene and isoprene; maleimides such as N-phenylmaleimide and N-cyclohexylmaleimide; acrylamides; maleic anhydride; alkyl esters of maleic acid; vinyl acetate; acrylonitrile; allylsulfonic acid; methallylsulfonic acid; and salts of these compounds. A single type or a combination of two or more types of these monomers may be used. Among these monomers, unsaturated monocarboxylic acids, unsaturated dicarboxylic acids and salts of these carboxylic acids are preferably used. Acrylic acid, methacrylic acid, maleic acid and maleic anhydride are more preferably used.

In the present invention, the molecular weight of the homopolymer of the polymerizable polyoxyalkylene monoalkyl ether derivative represented by formula [3] and the copolymer of 5 to 95% by mol of the polymerizable polyoxyalkylene monoalkyl ether derivative represented by formula [2] or [3] and 95 to 5% by mol of a monomer copolymerizable with the derivative is measured in accordance with gel permeation chromatography (hereinafter referred to as GPC) and a weight-average molecular weight is obtained on the basis of the value of polyethylene glycol used as the reference.

The process for producing the polymer of the present invention is not particularly limited. The polymerizable polyoxyalkylene monoalkyl ether derivative represented by formula [3] alone or a combination of the polymerizable polyoxyalkylene monoalkyl ether derivative represented by formula [2] or [3] and a monomer copolymerizable with the derivative can

Example 11

Using the same type of pressure-resistant reactor as that used in Example 1, cleaning and drying were conducted in accordance with the same procedures as those conducted in Example 1. After the reactor was cooled to the room temperature, 2,206 g of a commercially obtained dry acetone (the content of water: 44 ppm as measured in accordance with the Karl Fischer method) was placed in the reactor via the inlet tube of nitrogen gas. The pressure inside the reactor was raised to 0.05 MPa with dry nitrogen gas and the content of the reactor was stirred for 15 minutes. Acetone was then carefully taken out and 2,197 g of acetone was recovered. The content of water in the recovered acetone was obtained in accordance with the Karl Fischer method and found to be 63 ppm. The content of water inside the reactor obtained in accordance with equation (B) was 8.6.

The reactor was purged with dry nitrogen gas to remove acetone remaining inside the reactor. Steam was supplied to the steam jacket and the reactor was dried at a reduced pressure of 50 to 100 Torr for 1 hour. After the reactor was cooled to the room temperature, 46 g of a methanol solution of sodium methoxide (a product of KAWAKEN FINE CHEMICAL Co., Ltd.; SM-28; sodium methoxide: 28% by weight) was placed and the reactor was purged with nitrogen gas. After the temperature was raised to 90°C, 3,683 g of ethylene oxide was continuously supplied with a pressure via the inlet tube for nitrogen gas in the condition of 90 to 100°C and 0.6 MPa or lower while the content of the reactor was stirred. After the addition of ethylene oxide was completed, the reaction was allowed to proceed at 90 to 100°C for 2 hours. The reaction product was cooled to